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(58) Field of search

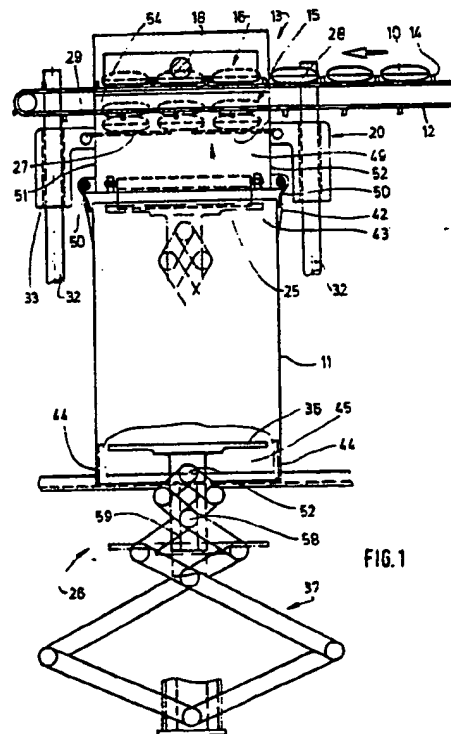
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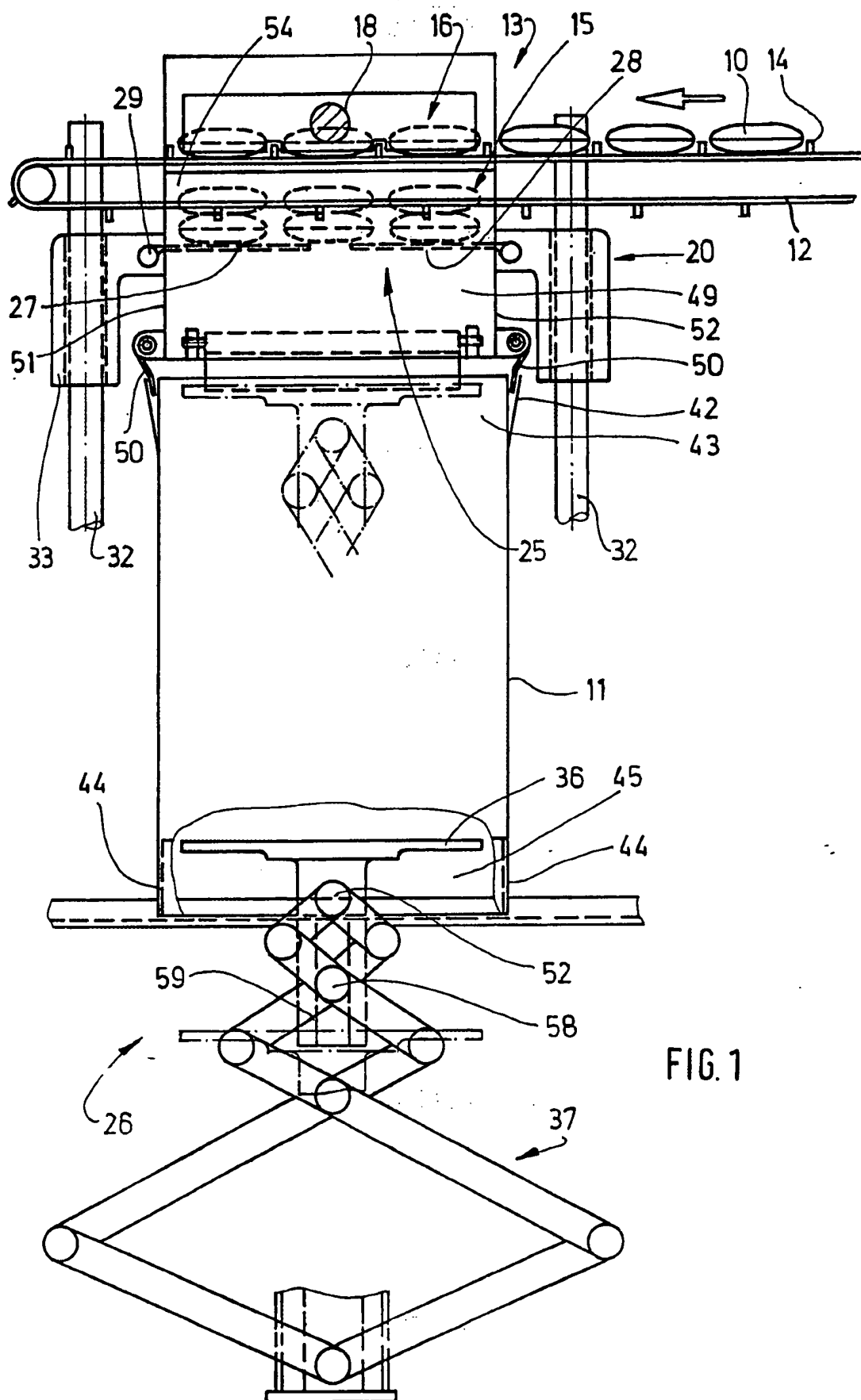
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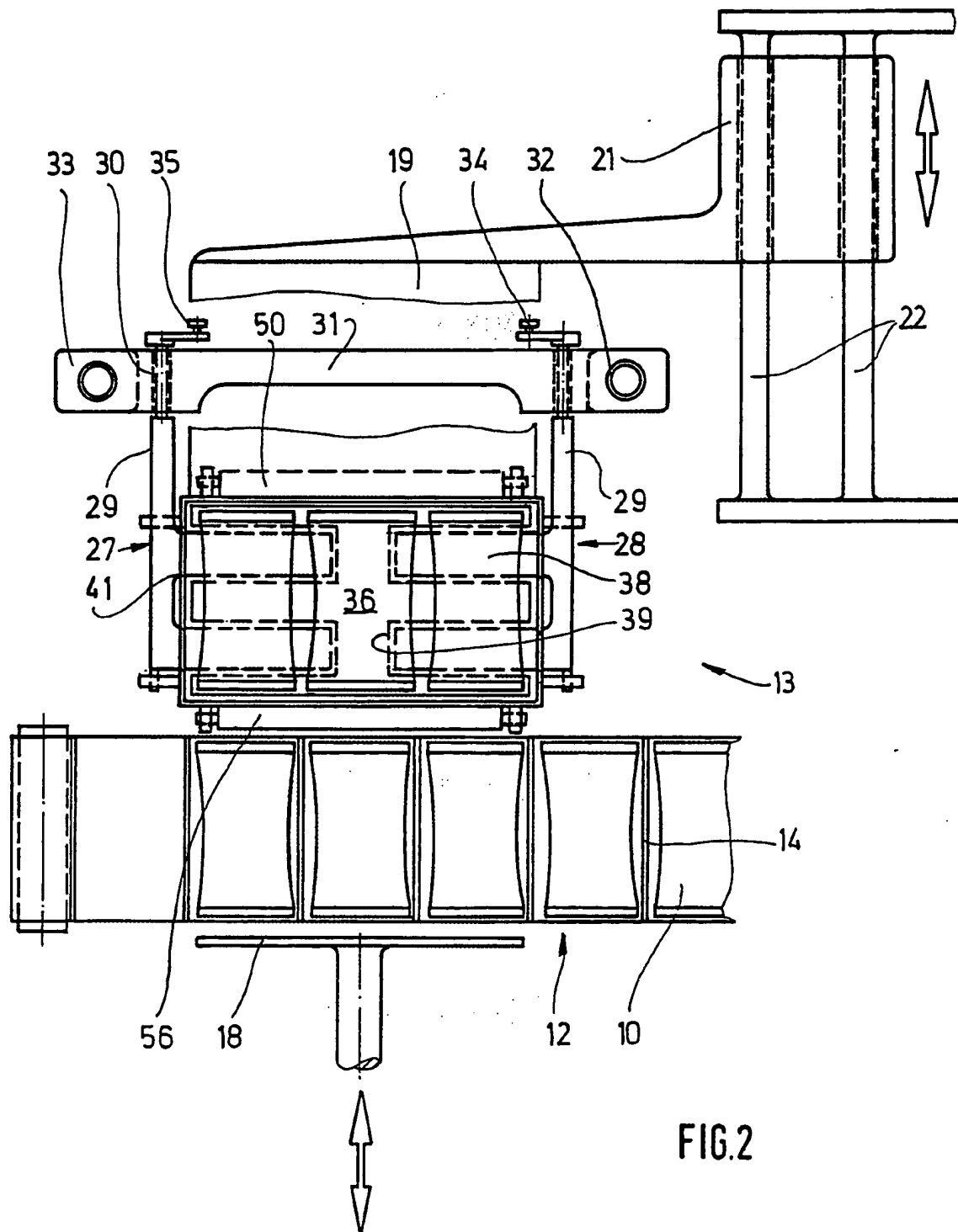
(54) Apparatus for filling cartons with foil bags

(57) In apparatus for packaging foil bags e.g. containing potato crisps, the foil bags 10 are fed to a packaging station 13 and are deposited on top of one another on a platform 36 of an elevator 26 which lowers the foil bags 10 into the carton 11 which is open at the top. The elevator 26 enters the carton 11, which is also open at the bottom, from below. The carton contents are lowered to the plane of a carton bottom. When the carton is discharged, folding flaps are folded over to form a carton bottom. To increase performance, upstream of the elevator 26 there is arranged a retractable plate into which bags are pushed from a feed conveyor 12, retraction of the plate disposing the bags on pivotal plates 27, 28 of a vertically reciprocable carrier 20. The carrier plates 27, 28 are comb-like as is the platform of the elevator so that the plates can extend into or below the plane of the platform to prevent interference therebetween during transfer of the bags. A full carton load may be built up on the carrier 20 prior to transfer onto the elevator platform or alternatively layers of bags may be progressively built-up on the elevator, the latter being incrementally lowered.



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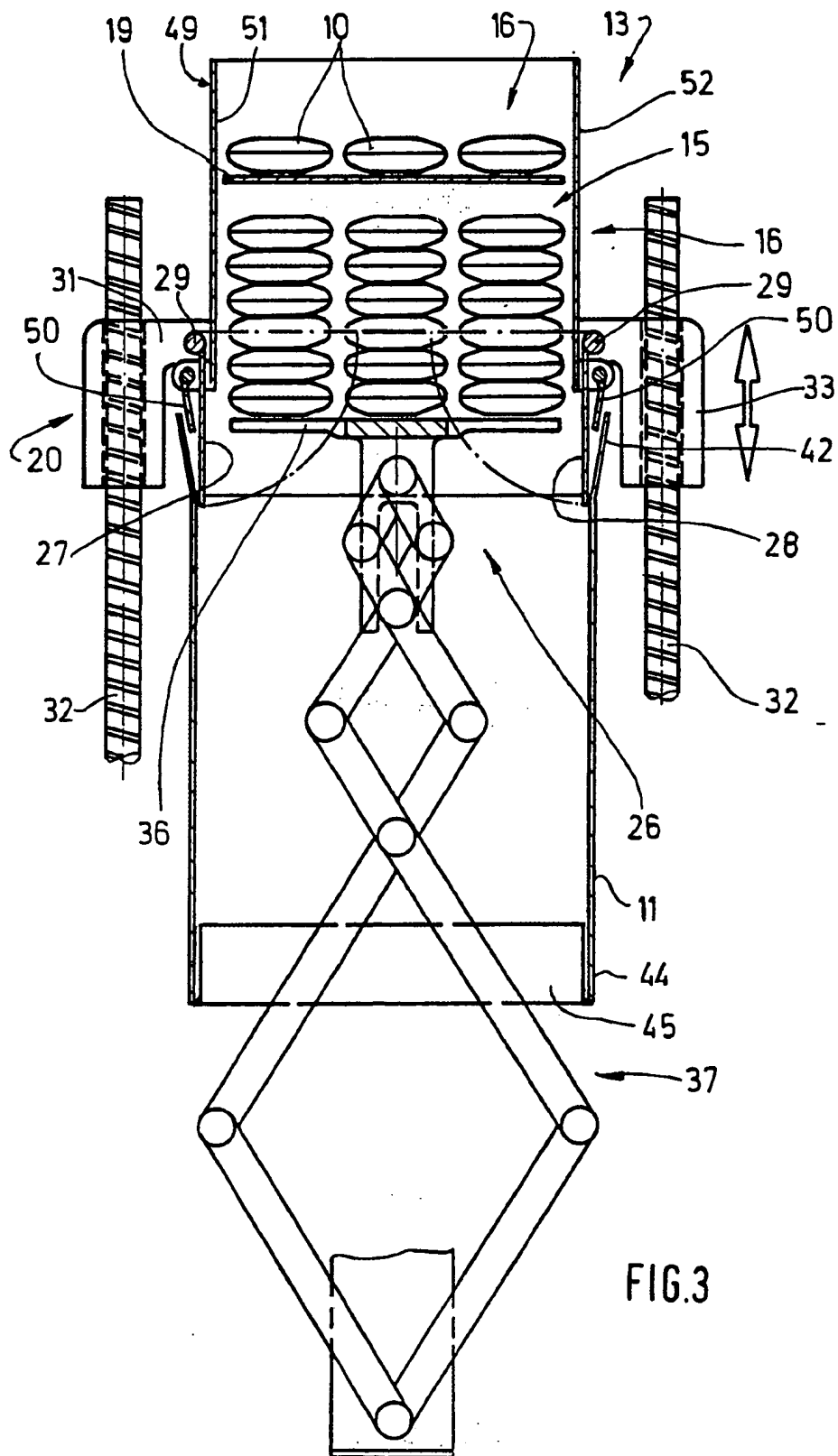


FIG.3

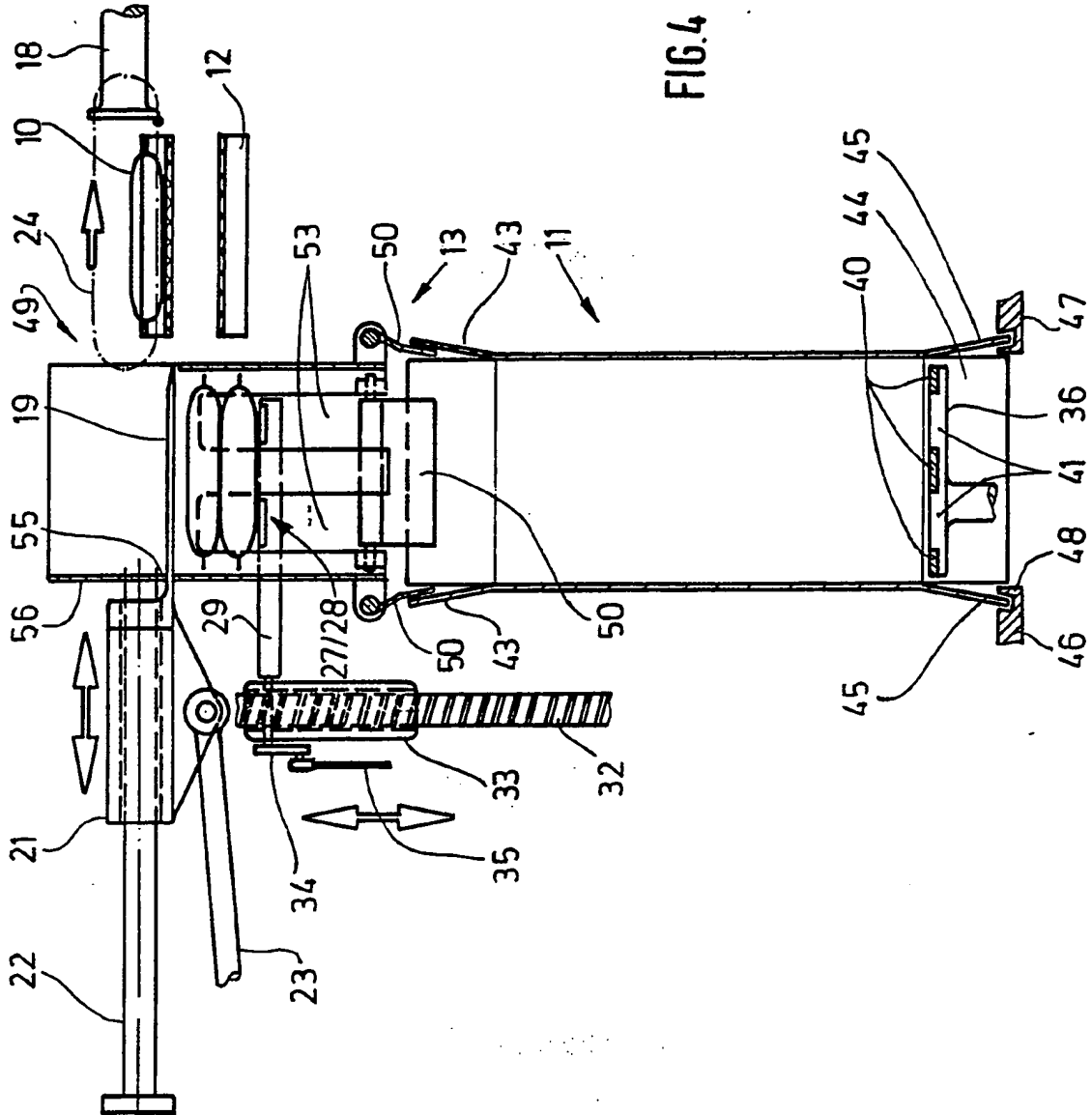
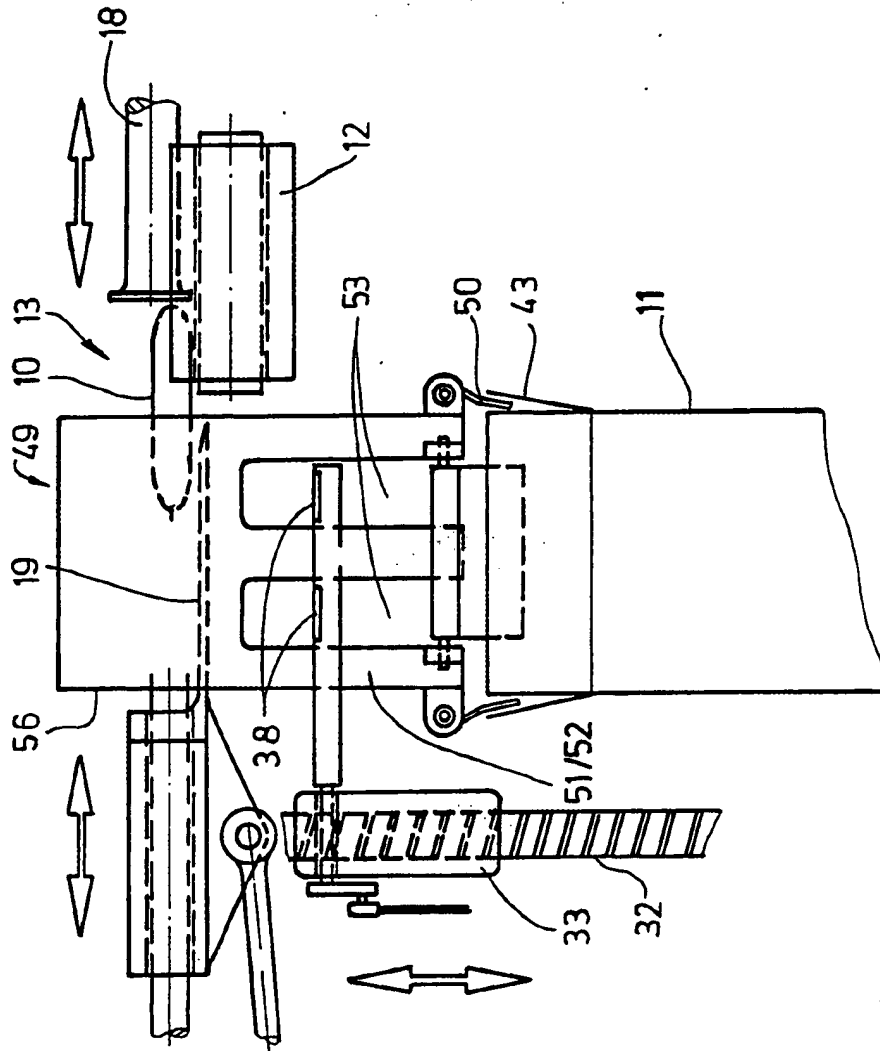


FIG. 5



APPARATUS FOR FILLING LARGE PACKS WITH FOIL BAGS

The invention relates to an apparatus for filling large packs (cartons) with a number of individual articles, especially foil bags for bulk goods, said articles (foil bags) being fed to a packaging station individually or in a continuous row and being lowered into the open carton from above.

To package foil bags (tubular bag packs) containing delicate bulk goods such as potato crisps is particularly problematic as the bag contents are very susceptible to mechanical stress. The foil bags are received in a voluminous packaging receptacle, especially a carton, in the form of a pack group. In the carton, the foil bags are arranged in tiers and each tier may comprise a plurality of foil bags lying side by side.

1 In a known apparatus for packaging such foil bags in
cartons, the foil bags are conveyed individually and in
succession onto a receiving platform which transfers the
foil bags to a collecting platform on which a group of bags
5 which will form the pack contents is collected and then
filled into the upwardly open carton as a unit. The foil
bags or the group of foil bags are in each case transferred
in a free fall. As a result, the foil bags and their con-
tents are subjected to considerable mechanical stress.

10 The invention is based on the object to propose an
apparatus for handling delicate articles, especially foil
bags containing delicate bulk goods, for the purpose of
filling the foil bags into a large receptacle (carton), in
15 which the process of filling or packing is conducted in a
way which treats the articles or foil bags particularly
carefully in order to protect its contents, even though per-
formance is very high.

20 To attain this object, the apparatus according to the
invention is characterized in that the articles can be
deposited on an elevator being up and downwardly movable
within the carton and they can be conveyed therewith in the
carton to their required pack position.

25 The apparatus according to the invention is based on the
idea to save the foil bags from falling down greater
heights. In particular, the group of bags shall be
introduced to the carton without any falling movements,
30 specifically by the elevator according to the invention
which can be lowered to the bottom of the carton, i.e. for
depositing the foil bags on the bottom.

35 In the upper position for receiving the foil bags, the
elevator is located outside the upwardly open carton,
namely above said carton. The foil bags are deposited on
the elevator as complete bag groups corresponding to the
contents of the carton or successively in smaller part

1 groups. In the latter case, i.e. when part groups are trans-
ferred to the elevator, the elevator is lowered by a height
corresponding to the height of the part groups, especially
tier by tier, until a complete group of bags has been
5 collected on the elevator.

The elevator preferably enters the carton from below and
for this purpose the carton is open at the bottom during
the filling process. In the lower position of the elevator,
10 the bag group is received by the carton whose bottom is
formed by folding bottom folding flaps.

According to the invention, the articles, namely foil bags,
are deposited above the elevator on an up and downwardly
15 movable intermediate conveyor which transfers the foil bags
as a complete bag group or successively as part groups
(tiers) to the elevator. Elevator and intermediate conveyor
are provided with platforms having recesses and projections
corresponding with one another, so that said lifting means
20 can be moved past one another when they conduct the con-
veying movements and transfer or receive the foil bags. To
be specific, the platforms are designed comb-like.

Further features of the invention relate to the conveying
means for handling the foil bags and the group formed
25 therewith. An illustrative embodiment of the apparatus
according to the invention will be described below in more
detail with reference to the drawings, in which:

30 Fig. 1 is a side view of the apparatus for packaging
foil bags,

Fig. 2 is a plan view of the apparatus according to
Fig. 1,

35

Fig. 3 is a vertical section of the apparatus according
to Figs. 1 and 2,

1 Fig. 4 is a vertical section or a view which is offset
 by 90° relative to Figs. 1 and 3,

5 Fig. 5 is a side view corresponding to Fig. 4 of the
 upper portion of the apparatus.

10 The apparatus shown in the drawings serves for packing foil
 bags 10 into a large pack, namely a carton 11. The foil
 bags 10, especially tubular bags, are filled with bulk
 goods, especially potato crisps, which are susceptible to
 mechanical stress.

15 A feed conveyor 12 feeds the foil bags 10 to a packaging
 station 13. This feed conveyor 12 is a belt conveyor with
 transverse webs 14 for accurately positioning the foil bags
 10 in a defined sequence on the feed conveyor 12.

20 In the region of the packaging station 13, the foil bags
 form a group of bags 15 forming the complete contents of
 the carton 11. The bag group 15 comprises a plurality of
 superposed tiers 16 made of a plurality of foil bags 10, in
 the present case of three foil bags 10. This tier forms a
 part group 17 of foil bags 10.

25 One part group 17 at a time, which in the present case com-
 prises three foil bags 10, is pushed off by a slide 18 in a
 direction transverse to the feed conveyor 12. At a distance
 above the carton 11, this part group 17 is deposited on an
 intermediate support, namely a support plate 19 which is
30 mounted on the side located opposite the feed conveyor 12
 on about the same level. The support plate 19 can be moved
 transversely. In the receiving position (Fig. 4), the
 support plate 19 is located in lifted position adjacent to
 the feed conveyor 12. By retracting the support plate 19,
35 the foil bags 10 of the part group 17 are stripped off the
 support plate 19 and are deposited on an up and downwardly
 movable intermediate conveyor 20.

1 The support plate 19 is mounted with a sliding member 21 on
support rods 22 for conducting the described movements. The
sliding member 21 can be moved backwards and forwards and
is actuated by a push rod 23.

5 The slide 18 is designed and guided during its movement
such that the return movement back to the initial position
- after a push-off movement has been conducted - takes
place at a distance above the feed conveyor 12, so that
10 during this time the feed conveyor 12 can be moved on by
another cycle. The path of motion 24 of the slide 18 is
shown in Fig. 4.

15 The foil bags 10 deposited on the intermediate conveyor 20
are moved downwards. A number of foil bags 10 is collected
on the intermediate conveyor in tiers 16 above one another.
The number of foil bags 10 on the intermediate conveyor 20
can be as high as the number of bags making up the complete
bag group 15 which forms the contents of the carton 11. In
20 the most simple case, only one part group 17 comprising
only one tier 16 is collected on the intermediate conveyor
20.

25 The intermediate conveyor consists of a carrier platform 25
being liftable up and down. In an upper initial position,
the carrier platform 25 is located directly below the plane
of the support plate 19. By retracting the support plate
19, the foil bags 10 are thus directly deposited on the
carrier platform 25. Thereafter, the carrier platform 25 is
30 moved downwards a certain distance so that following foil
bags 10 - a tier 16 - can be deposited on the part group 17
already formed on the carrier platform 25.

35 The part group 17 or bag group 15 formed on the interme-
diate conveyor 20 or the carrier platform 15 thereof is
transferred to an elevator 26 which is movable up and down
mainly within the carton 11. The elevator 26 takes over the
bag group 15 or part group 17 and deposits same in the

1 carton 11. The elevator 26 moves down transmittently and
continues to receive part groups 17 as long as it takes to
collect a complete bag group 15 forming the contents of the
carton 11.

5 To fulfill its functions, the intermediate conveyor 20 is
designed in a special way. The carrier platform 25 consists
of several, namely two carrier plates 27, 28. These are
independently movable, namely pivotable. In working
10 position, the carrier plates 27, 28 are located in a common
horizontal plane (dashed in Fig. 1). In this position, the
carrier plates 27, 28 together form the carrier platform 25
for receiving foil bags. By pivoting the carrier plates
27, 28 by 90°, they can be moved in a position on the side
15 next to the path of motion of the bag group 15 or part
group 17, so that the elevator 26 can receive the bags
(Fig. 3).

For this purpose, the carrier plates 27, 28 are each
20 laterally mounted in a pivotable manner. In the present
case, the carrier plates 27, 28 are each attached to a
pivot shaft 29. The pivot shafts are mounted with a pivot
bearing 30 in a support member, namely in a common cross-
piece 31, in an up and downwardly movable manner. This
25 crosspiece 31 is mounted in an up and downwardly movable
manner on upright guide means, namely spindle rods 32. A
guide member 33 located on the ends of the crosspiece 31 is
designed as a spindle nut. A turn of the spindle rods 32
therefore causes the crosspiece 31 and therewith the com-
30 plete carrier platform 25 to move up or down.

The pivoting movements of the carrier plates 27, 28 are
caused by rotating movements of the pivot shafts 29. On
each end of the pivot shafts 29 there is arranged a pivot
35 lever 34 which can be moved in the one or the other
direction by the push rod 35 and therewith effects partial
rotations of the pivot shaft 29.

1 The elevator 26 is provided with a platform 36 for
receiving the bag group 15 or part group 17. The platform
36 is arranged on a long-stroke vertical conveyor, in the
present case on lifting scissors 37. The platform 36 can be
5 moved up and down by these lifting scissors 37 between an
upper receiving position, which is corresponding to the
position shown in Fig. 3 but may also be considerably
higher, and a lower end position (dot-dash line in Fig. 1).
In an upper or intermediate position, the foil bags 10 are
10 received from the carrier platform 25. For this purpose,
platform 36 and carrier platform 25 are designed such that
they can be moved past one another.

15 In the present embodiment, the carrier plates 27, 28 on the
one hand and the platform 36 on the other hand are designed
comb-like. Web-like projections 38 of the carrier plates
27, 28 fit into corresponding recesses 39 of the platform
36. The platform 36 is also provided with web-like pro-
jections 40 which in their turn project into recesses 41 of
20 the platform 36. Carrier plates 27, 28 on the one hand and
platform 36 on the other hand are designed such that there
is a sufficient support surface for the foil bags 10.

25 When the foil bags 10 are transferred by the carrier
platform 25 to the platform 36, the carrier plates 27, 28
are lowered with the foil bags 10 until the carrier plates
27, 28 extend in or below the plane of the platform 36. As
a result, the foil bags 10 are taken over by the platform
36. Subsequently, the carrier plates 27, 28 are pivoted to
30 the side to an upright position. Thereafter, the platform
36 with the foil bags 10 can be moved down.

35 When a number of foil bags 10 (bag group 15) corresponding
to the contents of the carton 11 is collected on the
elevator 26 or the platform 36, the platform 36 is lowered
to the position shown in Fig. 1 (solid lines). Here, the
platform 36 is located in the plane of a bottom of the
carton 11.

1 The mode of operation of the described apparatus is as follows:

5 An empty carton 11 is supplied to the packaging station 13, for instance by hand. The carton is open at the top and bottom. Upper folding flaps, namely side flaps 42 and longitudinal flaps 43 extend the side walls of the carton 11. Lower side flaps 44 and lower longitudinal flaps 45 are downwardly directed and extend the associated side walls of
10 the carton. The carton is placed with the lower longitudinal flaps 45 onto a lateral holder, namely onto support rails 46, 47. These are provided with grooves 48 having a slightly tilted cross-section. The longitudinal flaps 45 enter these grooves 48 and are therewith fixed in the
15 inclined position.

Now, the elevator 26, coming from the lower initial position (dot-dash lines in Fig. 1), can enter the open carton 11 with the platform 36 from below. The platform 36
20 moves up to an upper receiving position.

At the top side, the carton 11 is prepared for an introduction of the foil bags. The carton 11 is located directly below a housing 49 having a rectangular cross-section. The dimensions (in the longitudinal and the
25 transverse direction) of this housing 49 are slightly smaller than the dimensions of the carton 11. Mouthpiece means 50, namely pivotable sheet metal strips or webs, are located at the lower edge of the housing 49. These strips
30 or webs are located at the inside of the upper side flaps 42 and longitudinal flaps 43. To widen the top of the carton in a funnel-shaped manner, the side flaps 42 and longitudinal flaps 43 are slightly pushed to the outside by the mouthpiece means 50 to an inclined position. This
35 facilitates the process of filling in the bags and prevents malfunctions.

1 Moreover, the housing 49 is designed such that the means
entering the housing 49 from the side find appropriate
recesses. Narrow side walls 51, 52 of the housing are pro-
vided with upright slots 53 so that the carrier plates
5 27, 28 or the projections 38 thereof can enter the housing
49.

In the upper region, a longitudinal wall 54 has a smaller
overall height (Fig. 4) to allow the slide 18 to push the
10 foil bags 10 into the housing 49, namely onto the support
plate 19. The support plate 19 passes through a slot 55 in
the opposite longitudinal wall 56.

When a sufficient number of foil bags is collected on the
15 intermediate conveyor 20, i.e. on the carrier platform 25
thereof, the bag group 15 or part group 17 is transferred
to the platform 36 by means of a respective downward
movement of the carrier platform 25. When a bag group 15
corresponding to the contents of the carton 11 is collected
20 on the platform 36, the downward movement to the already
described position on a level with the carton bottom is con-
ducted. Now, the carton 11 is pushed off together with the
contents in the direction of the support rails 46, 47. In
this process, first the side flap 44 being forward in the
25 direction of movement is folded over by a folding means
(not shown). The pushing-off movement reaches far enough
for the platform 36 to be emptied so that it can be moved
to the lower position. The other flaps of the carton 11 are
folded in an appropriate way, especially in analogy to the
30 solution disclosed in EP-B-0 113 899.

After the transfer of the bag group 15 to the platform 36,
that is to say after the platform 36 has been lowered, the
intermediate conveyor 20 returns to the upper initial
35 position. Consequently, foil bags 10 can be continuously
fed to the intermediate conveyor 20 without delays while
the carton 11 is filled and pushed off. By the time the
next carton is moved to the filling position, the inter-

1 mediate conveyor 20 has already received a greater number
of foil bags 10. Performance is thus very high.

5 The apparatus can be operated such that a bag group 15
corresponding to the complete contents of the carton 11 is
first collected on the intermediate conveyor 20 and then as
a whole transferred to the elevator 26. Instead, it is also
possible to form part groups 17 made up of one or several
10 tiers 16 and to transfer this part group 17 to the elevator
26 in the upper position of the platform 36. In this mode
of operation, the carrier plates 27, 28 remain in the
laterally pivoted position. The other foil bags 10 or tiers
16 are now directly deposited on the platform 36 or rather
15 on the part group 17 already lying on the platform 36. Now,
the platform 36 is lowered section by section, corre-
sponding to the height of one tier 16, until the complete
bag group 15 is formed.

20 Regarding the lifting movement of the platform 36, the lift-
ing scissors 37 are particularly suitable for covering the
relatively great lifting heights. In the present case,
lifting scissors 37 with a transmission ratio of 2.5 : 1
are provided. To attach and guide the lifting scissors 37,
an upper center link 57 is firmly connected with the bottom
25 side of the platform 36. A center link 58 is located there-
under and guided in a guide slot 59. The guide slot is
formed by a guide member 60 on the bottom side of the
platform 36.

30

35

CLAIMS

1. An apparatus for filling large packs (cartons) with a number of individual articles, especially foil bags for bulk goods, said articles (foil bags) being fed to a packaging station individually or in a continuous row and being lowered into the open carton from above, wherein the articles (foil bags) are depositable on an elevator being movable up and down within the carton or the like and said articles are conveyable by said elevator into the carton to a required pack position.

2. The apparatus as claimed in claim 1, wherein the elevator is lowerable from an upper initial position, especially above the open carton, intermittently in response to the feed of foil bags until a group of foil bags (bag group) corresponding to the carton contents is formed and wherein said elevator is lowerable with the bag group to deposit said bag group in the carton.

3. The apparatus as claimed in claim 1 or 2, wherein the elevator can be introduced from below to the carton, which is (also) open at the bottom, and passes through said carton.

4. The apparatus as claimed in claim 1 and one or more of the further claims, wherein upstream of the elevator there is arranged an intermediate conveyor onto which foil bags in the form of a part group or a bag group corresponding to the carton contents are depositable, said part group or said bag group being transferrable to the elevator in an upper position of said elevator.

x 5. The apparatus as claimed in claim 4 and one or more of the further claims, where_in a part group is collectable by the intermediate conveyor and is transferrable to the elevator and wherein further foil bags are directly feedable to said elevator to form a complete bag group, especially in the form of tiers while the elevator is lowered in steps.

6. The apparatus as claimed in claim 1 and one or more of the further claims, wherein tiers comprising especially three side by side foil bags are formed by being pushed off a feed conveyor and are depositable on the intermediate conveyor (carrier platform) or the elevator (platform).

7. The apparatus as claimed in claim 1 and one or more of the further claims, wherein the incoming foil bags are depositable on a

support plate being an intermediate support, preferably by means of being pushed off the feed conveyor, and wherein the foil bags are depositable by the support plate onto the intermediate conveyor or the elevator by means of a retraction of said support plate.

8. The apparatus as claimed in claim 4 and one or more of the further claims, wherein the intermediate conveyor or the carrier platform thereof can be moved out of the path of motion of the bag group or part group, especially by means of pivoting away parts (carrier plates) of the carrier platform to an upright lateral position.

9. the apparatus as claimed in claim 8 and one or more of the further claims, wherein the carrier plates forming the carrier platform of the intermediate conveyor are mounted on lateral conveying means, especially on spindle rods for commonly moving the carrier plates up and down.

10. The apparatus as claimed in claim 4 and one or more of the further claims, wherein intermediate conveyor and elevator can be moved past one another without touching in order to transfer foil bags, especially by means of a comb-like design of, on the one hand, the carrier platform and, on the other hand, the platform.

11. The apparatus as claimed in claim 1 and one or more of the further claims, wherein a housing being open at the top and bottom is arranged above the carton for receiving the foil bags when bag groups or part groups are formed.

12. The apparatus as claimed in claim 3 and one or more of the further claims, wherein the carton being open at the bottom is supported with extended or slightly inclined folding flaps (longitudinal flaps) in guide means, especially in support rails extending in the direction of discharge.

13. The apparatus as claimed in claim 1 and one or more of the further claims, wherein the elevator or the platform thereof is movable by means of lifting scissors.

14. An apparatus for filling large packs with a number of individual articles substantially as hereinbefore described, with reference to the accompanying drawings.